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ULTRASONIC STAIN REMOVAL METHOD AND APPARATUS

Inventor: Keisuke Honda  
62-1 Aza Shin-Sanbongi,  
Sanbongi-cho, Toyohashi-shi  
Applicant: Keisuke Honda  
62-1 Aza Shin-Sanbongi,  
Sanbongi-cho, Toyohashi-shi  
Agent: Yoshio Suzuki, patent attorney

Claims

1. An ultrasonic stain removal method, characterized by removing stains by applying a piece of fabric or paper soaked in water or detergent and the like to the front or back surface of a stained portion and applying an ultrasonic wave generating head to the above-mentioned stained portion or the above-mentioned fabric or paper.

2. An ultrasonic stain removal apparatus, in which a horn having an ultrasonic wave generating head at the tip thereof is connected to an ultrasonic vibrator, with a vibrogenerator connected to said ultrasonic vibrator.

### **Industrial application field**

The present invention relates to an ultrasonic stain removal method providing a simple way to remove stains caused by alcoholic beverages, soy sauce, and the like from nonJapanese garments or Japanese traditional dress.

### **Prior art**

In the past, to remove stains caused by alcoholic beverages, soy sauce, and the like from nonJapanese garments or Japanese traditional dress, one would apply a piece of cloth soaked in water or tea to the stained portion and then pat and rub it, but the disadvantage of this method was that satisfactory stain removal could not be achieved. In addition, the disadvantage of this method was that even if the stained portion was subjected to the same pat-and-rub treatment using a piece of fabric or paper soaked in a volatile petroleum fraction, satisfactory stain removal still could not be achieved.

### **Problems to be solved by the invention**

Therefore, prior art methods had the disadvantage that they did not provide a simple way to remove stains from nonJapanese garments or Japanese traditional dress.

### **Means to solve the problems**

In order to overcome the above-described problems, the present invention is characterized by removing stains by applying a piece of fabric or paper soaked in water or detergent and the like to the front or back surface of a stained portion and applying an ultrasonic wave generating head to the above-mentioned stained portion or the above-mentioned fabric or paper.

### **Function**

When a piece of nonJapanese or Japanese traditional dress and the like is stained with alcoholic beverages, soy sauce, and the like, the stains can be removed by applying a piece of fabric or paper soaked in water or detergent and the like to the stained portion and applying an ultrasonic wave generating head to the fabric or paper and the like or to the stained portion of the nonJapanese garment or Japanese traditional dress and the like.

### **Application examples**

Figure 1 shows a block diagram of an ultrasonic stain removal apparatus using the ultrasonic stain removal method used in an application example of the present invention, where a horn (2) having an ultrasonic wave generating head (1) at the tip thereof has an ultrasonic

vibrator (3) connected thereto. A generator (4) is electrically connected to the ultrasonic vibrator (3), with the generator (4) driven by a power supply (5). In addition, the generator (4) may either generate a constant-frequency signal or a variable-frequency one.

When, as shown in Figure 2, in order to remove stains from nonJapanese garments or Japanese traditional dress and the like using the thus-constructed ultrasonic wave generator, a piece of fabric or paper (7) soaked in water or detergent and the like is placed on top of the stained portion of the nonJapanese garment or Japanese traditional dress (6) and ultrasonic waves are generated by applying the ultrasonic wave generating head (1) of the ultrasonic wave generator of Figure 1 to the fabric or paper (7); as a result of ultrasonic vibration, the stain adhered to the nonJapanese garment or Japanese traditional dress (6) can be transferred to the fabric or paper (7), and the stain can be removed from the nonJapanese garment or Japanese traditional dress (6).

Also, as shown in Figure 3, when a piece of fabric or paper (7) soaked in water or detergent and the like is placed underneath the stained portion of the nonJapanese garment or Japanese traditional dress (6) and ultrasonic waves are generated by applying the ultrasonic wave generating head (1) to the nonJapanese garment or Japanese traditional dress (6), as a result of ultrasonic vibration, the stain adhered to the nonJapanese garment or Japanese traditional dress (6) can be transferred to the fabric or paper (7), and the stain can be removed from the nonJapanese garment or Japanese traditional dress (6).

Therefore, based on the ultrasonic stain removal method of the present application example, stains can be removed while wearing nonJapanese and Japanese traditional dress, which makes it an extremely convenient method.

Figure 4 is a block diagram of an ultrasonic stain removal apparatus in another application example of the present invention, where (1) is an ultrasonic wave generating head, (2) is a horn, and a Langevin type ultrasonic vibrator (8) is used as the ultrasonic vibrator connected to the horn (2).

This construction allows for efficiently removing stains in the same manner as in the above-described application example.

In addition, volatile petroleum fractions, such as benzene or gasoline, and other soil and stain removing agents can be used in addition to water and detergents as the material in which the fabric or paper and the like are soaked. Additionally, ultrasonic waves can be generated after soaking the stained portion in water or detergent and the like, bringing pieces of fabric or paper and the like soaked in water in contact with the stained portion of the nonJapanese garment or Japanese traditional clothing from both sides or on one side alone, and applying the ultrasonic wave generating section (1) to the fabric or paper and the like, or to the stained portion.

### **Effect of the invention**

As is evident from the explanations above, the present invention is convenient for professional cleaners, etc. to use in removing stains from clothing, and when one obtains a stain from an alcoholic beverage, etc., during a reception and the like, stains can be removed in a simple manner by bringing a piece of fabric or paper, etc., soaked in water, detergent, and the like in contact with the stained portion while wearing nonJapanese garments, Japanese traditional dress, etc., and generating ultrasonic waves by applying an ultrasonic wave generating head to the stained portion, or to the fabric or paper and the like, which also makes the method extremely convenient.

### **Brief description of the figures**

Figure 1 is a block diagram of an ultrasonic wave generating apparatus used in an application example of the present invention, which is used in the ultrasonic stain removal method of the present invention; Figure 2 and Figure 3 are figures used for explaining the ultrasonic stain removal method of the present invention; and Figure 4 is a block diagram of an ultrasonic wave generating apparatus used in an application example of the present invention, which is used in the ultrasonic stain removal method of the present invention.

- 1      Horn
- 2      Ultrasonic wave generating head
- 3, 8   Ultrasonic vibrators
- 4      Generator
- 5      Power supply
- 6      NonJapanese garment or Japanese traditional clothing
- 7      Fabric or paper

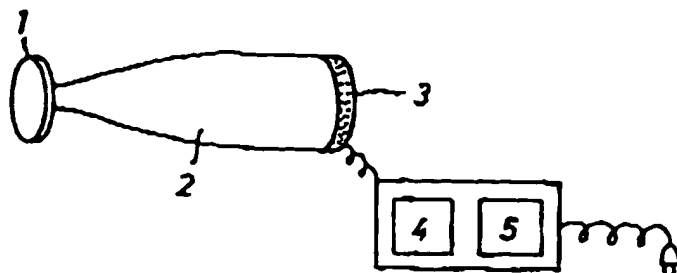


Figure 1



Figure 2

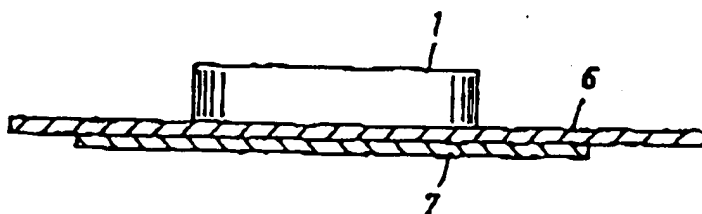


Figure 3

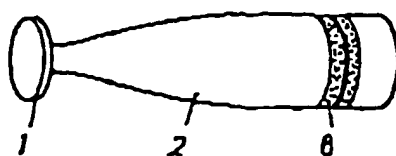


Figure 4